Code Dx Install Guide

CODE DX VERSION
v1.5.2

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1 Requirements

1. The Java Runtime Environment version 7 or later installed on the server machine
2. For .NET analysis
    a. The latest version of the .NET runtime
    b. FxCop (Code Analysis) 10, 11, or 12
    c. CAT.NET v1 32-bit or 64-bit
3. A Java-based web server like Jetty or Tomcat that is capable of serving `.war` files.
4. A copy of Code Dx. This will generally be a `.zip` file containing `codedx.war`, this guide, and a few other files.

2 Installing .NET Tools

It is recommended that the latest version of .NET be installed.

Code Dx is capable of running multiple .NET analysis tools on your codebase. FxCop and CAT.NET are two of the supported tools and are developed and distributed by Microsoft. The end-user license agreements for these products forbid their redistribution, therefore, Secure Decisions is unable to legally bundle these tools. So in order for Code Dx to run these tools on your behalf, you must install them separately. Code Dx will then automatically discover their location and run them.

Depending on the version of FxCop you plan to use, it will either be bundled with Visual Studio (as Code Analysis) or in the Windows SDK. For the best results, install Visual Studio 2012 or 2013 Premium. This will give you the latest rules available. Code Dx will automatically discover the location of the latest version of FxCop installed on your machine. If you would like to provide a specific location, set the `fxcop.path` property in the Code Dx configuration file.

Code Dx will work with either CAT.NET 32-bit or CAT.NET 64-bit. These can be downloaded from the Microsoft website. CAT.NET 32-bit has an installer and Code Dx will automatically look in the default installation directory for this application. The 64-bit version is in a zip file. The best approach to using the 64-bit version is to overwrite the 32-bit files with the 64-bit files. Alternatively, the path can be manually set using the `cat.net.path` property in the Code Dx configuration file.

3 Configuration

Code Dx must be configured before installation. Failure to do so will most likely result in runtime failures, or at the very least, unexpected behavior. There are several different pieces of configuration that need to be performed.

3.1 Appdata Directory

Code Dx needs a place to store a variety of files: the analysis run inputs it receives including the source code that it uses to display in the weakness details page; log files; and configuration files. We group all of these under what we call the Code Dx appdata directory.

Since Code Dx can be deployed on a variety of different platforms and servlet containers, we cannot make assumptions about where this appdata directory should be. As such, you must configure this before-hand.

There are two options available to tell Code Dx where its application data should be stored.

1. Set a Java System Property named `codedx.appdata` to the location of the appdata folder, for the Java runtime that the server will run on. This is done by passing the command line argument `-Dcodedx.appdata="path/to/config"` to the `java` call that starts the server.
2. Set the `CODEDX_APPDATA` environment variable to the location of the appdata folder.

The location of the appdata directory may be an absolute or relative path. If you do not provide one of these options, Code Dx will fail to start. If you provide both, priority will be given to the Java System Property.

This folder should be kept intact during Code Dx upgrades. Therefore it is recommended that it be stored in a stable location. Normally, you won't need to touch this folder after installing Code Dx, unless configuration tweaks are desired.

3.2 Config Contents

3.2.1 License

A valid Code Dx license is required to run Code Dx. Code Dx looks for the license file in the appdata directory when it starts up. The license file should have been provided to you when you received the instructions to download the Code Dx files. Place the license file (ending in `.lic`) in the Code Dx appdata directory and it will take effect the next time Code Dx starts up.

3.2.2 Logging

Code Dx uses Logback for logging. To configure Logback, add a `logback.xml` file to the appdata directory. An example Logback configuration will be provided in the `sampleConfig` folder of a distribution copy of Code Dx. For more information about the logging configuration, consult the Logback manual.

3.2.3 Code Dx Properties

The most important configuration file is `codedx.props` ("the 'props' file"), which is expected to be located in the appdata directory. The 'props' file determines:

- Database connection information
- Super user credentials
- Analysis behavior
- Active Directory login information

The 'props' file is formatted as a .properties file, using key-value pairs to set various configuration fields. An example 'props' file is provided in the `sampleConfig` directory of a distribution copy of Code Dx.

3.2.4 Database Connection Properties

In order for Code Dx to access a database, you will need to tell it where the database is, what type of database it is, and how to log in. For example, a connection to a MySQL database would be configured as follows:

```
swa.db.url = jdbc:mysql://localhost/codedx
swa.db.driver = com.mysql.jdbc.Driver
swa.db.user = database_username
swa.db.password = database_password
swa.db.datasource = com.mysql.jdbc.jdbc2.optional.MysqlDataSource
```

This configuration describes a MySQL database that is running on the same machine as the Code Dx server, with a username of "database_username" and password of "database_password".

> Note that Code Dx does **not** create the database **nor** the user it uses for connections. The assumption is that the database and user are created ahead of time by the database administrator. Once those are ready, Code Dx will use the connection information to create the tables it needs.

An H2-based configuration would look like:

```
swa.db.url = jdbc:h2:codedx;DB_CLOSE_DELAY=5;LOCK_TIMEOUT=5000
swa.db.driver = org.h2.Driver
swa.db.datasource = org.h2.jdbcx.JdbcDataSource
swa.db.database = codedx
swa.db.user =
swa.db.password =
```

In this case, the username and password are not used, and the database will be created in (or read from) a `codedx.db` file at whatever the Java server considers to be the working directory. Note the `DB_CLOSE_DELAY` and `LOCK_TIMEOUT` settings in the `swa.db.url` field. For performance reasons, we recommend using these settings if you choose to use an H2-based database configuration.

3.2.5 Database Permissions

You must ensure that the "user" that Code Dx uses to access your database is given the following permissions:

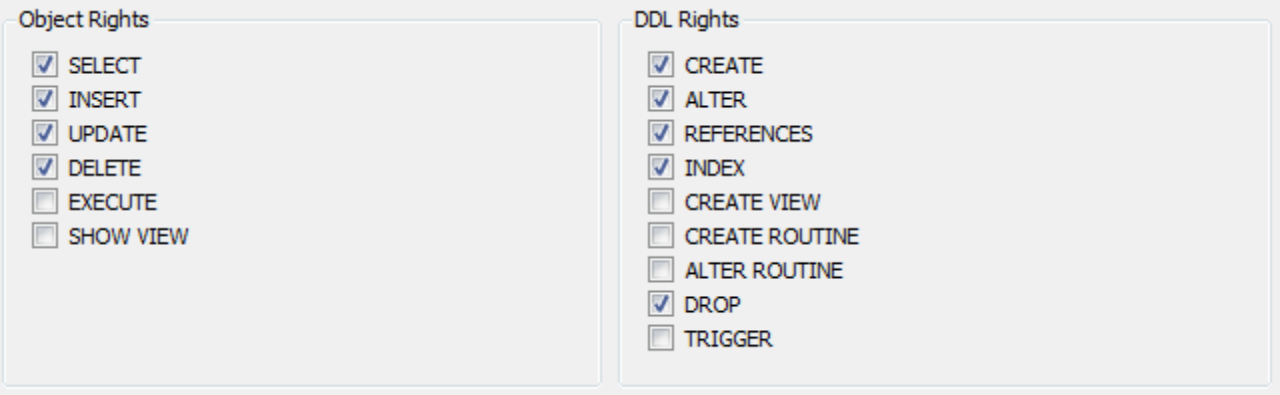
For records:

- SELECT
- INSERT
- UPDATE
- DELETE

For tables:

- CREATE
- ALTER
- REFERENCES
- INDEX
- DROP

In MySQL Workbench, under Users and Privileges > Schema Privileges (tab), you should see this:



3.2.6 Remember-Me Support

Code Dx supports three levels of "Remember-Me" support. You can set the level that Code Dx will use by setting the `swa.user.rememberme` field in the config file.

The three supported configuration values are:

- `full` – Code Dx will remember any user who logs in. Once logged in, users will not need to log in via the login form even after their session expires. They will be remembered by a special cookie, until that cookie expires. The "rememberMe" cookie does not contain the user's password in any way, shape, or form.
- `username-only` – Code Dx will remember the username of any user who logs in. This is used to auto-fill the username field of the login form. Users are remembered by a cookie, until that cookie expires. This cookie simply contains the user's name.
- `off` – Code Dx will not remember anything about a user once that user's session expires or if they log off.

Note: for `full` and `username-only` modes, users can opt-out of being remembered by Code Dx by unchecking the "remember me" checkbox in the login form.

3.2.7 Analysis Behavior

There are two settings that allow you to affect Code Dx's behavior regarding its analysis of SwA data files.

1. You can control how many independent SwA analyses run at once by setting the `swa.analyzers.count` property to a number. The analysis process can be very resource-intensive, so we recommend using a low number initially until you have a better sense for your usage load.

This number controls the size of the "analysis queue". For example, if `swa.analyzers.count=1` and someone has started an analysis, a second analysis won't start until the one worker is finished with the first analysis. Users will still be able to queue new analyses even if all of the analysis workers are busy.

While you are free to change that value to higher ones, please me mindful that it has a direct impact on both the application and database server performance. As a general rule, the more powerful the hardware, the more it will be able to process simultaneously.

2. By default, Code Dx will store the last 5 copies of your analyses per project. To change that behavior you should change the value of the `swa.storage.num-analysis-runs-to-keep` property in the configuration file.
3. For the analyses that are stored, Code Dx will by default maintain a copy of the raw inputs it received for processing. While these inputs are not used by Code Dx once it finishes the analysis process, they are kept around for archival. If storage space is an issue, the `swa.storage.keep-raw-inputs` can be set to `false` to prevent Code Dx from storing the raw inputs.
4. Code Dx bundles various static analyzers that run independently during the analysis process. Each of these tools requires a memory budget during its own analysis. The memory requirements vary based on the sizes of the codebases the analyzers are checking. By default, Code Dx allows each Java-based tool to allocate up to 1GB of memory using the `java.tools.maxmemory` property. This can be changed, however, to better match your project sizes. CAT.NET is given 2 GB but this can be changed using `cat.net.maxmemory`. Ruby-based tools are run via JRuby, and are allowed a default maximum of 1GB of memory. This can be changed using `ruby.tools.maxmemory`.

Changing any of the analysis behavior properties can be done at any time after the initial installation, however, you will still need to restart the server in order to reload the properties.

3.2.8 Active Directory Configuration

Code Dx allows you to create and delete new users that are only known to the Code Dx system. You may, however, want to let users use the same credentials as they do for your organization. To facilitate this, you must set up an Actve Directory configuration in the 'props' file. For example:

```
shiro.activedirectory.realm =
org.apache.shiro.realm.activedirectory.ActiveDirectoryRealm
shiro.activedirectory.url = ldap://172.17.17.8:389/
shiro.activedirectory.searchbase = dc=avi,dc=com
```

The settings `shiro.activedirectory.realm`, `shiro.activedirectory.url`, and `shiro.activedirectory.searchbase` corrsepond to the `activeDirectoryRealm,activeDirectoryRealm.url`, and `activeDirectoryRealm.searchBase` properties in an Apache Shiro-based `.ini` configuration.

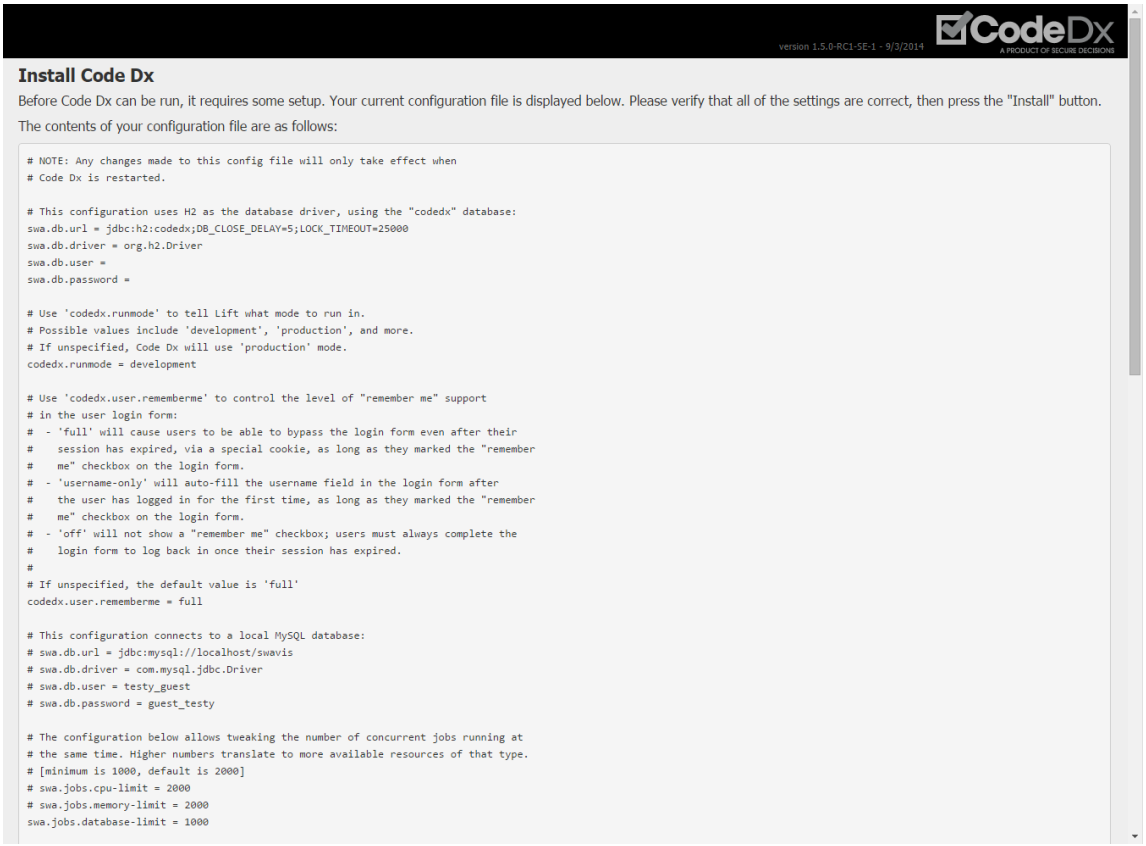
4 Installation

Once configuration is ready, installation should be relatively straight-forward. Deploying the codedx.war file to your servlet container is the next step. This varies from one application server to the next as well at the configuration and deployment options enabled on your server. Please refer to your servlet container user manual for instructions on deploying war packages. Once Code Dx is deployed, if you configured logging, you should be able to find an `INFO` message stating something to the effect of:

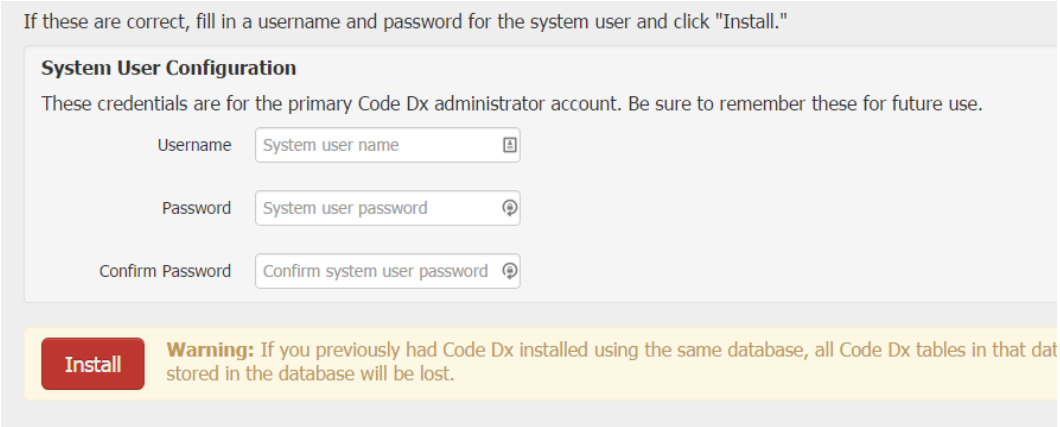
```
#########################################################################
#                                                                       #
# The Server is now ready!                                              #
#                                                                       #
# To start using Code Dx, load the following URL in your browser:  #
#    http://localhost:8080/                                             #
#                                                                       #
#########################################################################
```

It may help to configure logging so that `INFO` messages are printed to the console, or else you may have to dig into a log file.

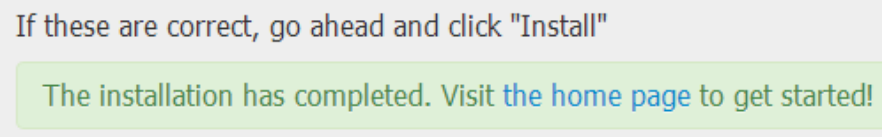
Once this is done, visit the Code Dx deployment URL (e.g. `https://myservletcontainer/codedx/`). You should automatically be redirected to the `/install` page, which will look like this:


version 1.5.0-RC1-SE-1 - 9/3/2014
CodeDx
A PRODUCT OF SECURE DECISIONS
Install Code Dx
Before Code Dx can be run, it requires some setup. Your current configuration file is displayed below. Please verify that all of the settings are correct, then press the "Install" button.
The contents of your configuration file are as follows:
# NOTE: Any changes made to this config file will only take effect when
# Code Dx is restarted.
# This configuration uses H2 as the database driver, using the "codedx" database:
swa.db.url = jdbc:h2:codedx;DB_CLOSE_DELAY=5;LOCK_TIMEOUT=25000
swa.db.driver = org.h2.Driver
swa.db.user =
swa.db.password =
# Use 'codedx.runmode' to tell Lift what mode to run in.
# Possible values include 'development', 'production', and more.
# If unspecified, Code Dx will use 'production' mode.
codedx.runmode = development
# Use 'codedx.user.rememberme' to control the level of "remember me" support
# in the user login form:
# - 'full' will cause users to be able to bypass the login form even after their
# session has expired, via a special cookie, as long as they marked the "remember
# me" checkbox on the login form.
# - 'username-only' will auto-fill the username field in the login form after
# the user has logged in for the first time, as long as they marked the "remember
# me" checkbox on the login form.
# - 'off' will not show a "remember me" checkbox; users must always complete the
# login form to log back in once their session has expired.
#
# If unspecified, the default value is 'full'
codedx.user.rememberme = full
# This configuration connects to a local MySQL database:
# swa.db.url = jdbc:mysql://localhost/swavis
# swa.db.driver = com.mysql.jdbc.Driver
# swa.db.user = testy_guest
# swa.db.password = guest_testy
# The configuration below allows tweaking the number of concurrent jobs running at
# the same time. Higher numbers translate to more available resources of that type.
# [minimum is 1000, default is 2000]
# swa.jobs.cpu-limit = 2000
# swa.jobs.memory-limit = 2000
swa.jobs.database-limit = 1000

You will need to set the username and password for the admin user.


If these are correct, fill in a username and password for the system user and click "Install."
System User Configuration
These credentials are for the primary Code Dx administrator account. Be sure to remember these for future use.
Username
System user name
Password
System user password
Confirm Password
Confirm system user password
Install
Warning: If you previously had Code Dx installed using the same database, all Code Dx tables in that dat
stored in the database will be lost.

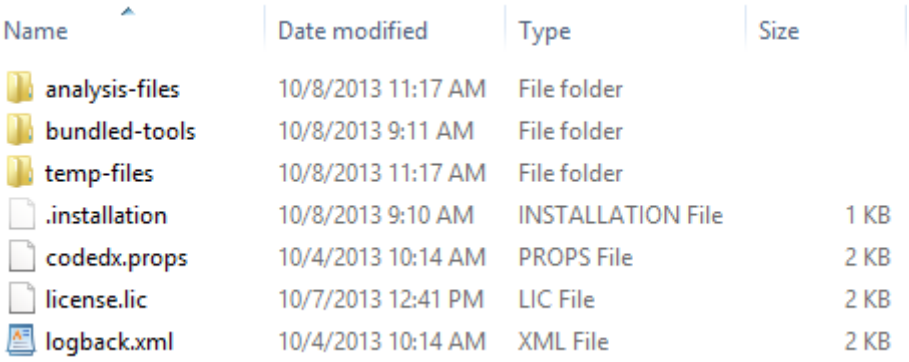
After reviewing the configuration and entering the desired admin user credentials, press the "Install" button. You should see a message saying that the "installation process has started", with a blue background. Once it's finished you should see this:



4.1 Reinstallation

If for some reason you need to change the database configuration or the Super User's credentials, you will need to re-install Code Dx. Fortunately, this is easy. When you first installed Code Dx, it created a `.installation` file in the config folder. Every time Code Dx starts up, it will search for this file; if it does not find the file, it will present you with the installation page again.

Here are the contents of an example config folder after installation:



In short, to reinstall, simply make any changes you want to the `codedx.props` file, delete the `.installation` file and the following directories: `analysis-files`; `bundled-tools`. Finally, restart Code Dx on the web server.